IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner	:	Bryan R. Muller
Art Unit	:	3723
Applicant	:	Wan-Shick Kim
Serial No.	:	10/676,643
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For	:	Apparatus and Methods for Slurry Flow Control

Commissioner for Patents
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DECLARATION OF MR. WAN-SHICK KIM, UNDER 37 CFR § 1.132

Sir:

I, Mr. Wan-Shick KIM, declare:

THAT I am the inventor for the above-identified U.S. patent application;

THAT I am currently employed by Dongbu Hitek Co., Ltd. as a General Manager, Production Engineering Team and have been continuously employed by Dongbu Hitek Co., Ltd. since Oct. 1, 2000;

THAT I have extensive experience in this field as evidenced by my responsibilities at Dongbu Hitek Co., Ltd., including process development and equipment engineering, and my Master's degree in Ceramic Engineering obtained in 1994 at Yonsei University in Seoul, Korea.

THAT I am familiar with the technology described and claimed in the above-identified U.S. patent application; and

THAT I have reviewed and am familiar with Application Serial No. 10,676,643; the claims currently pending therein; the Office Action dated April 2, 2008; and the Kondo *et al.* (U.S. Pat. Pub. No. 2002/0061722), Kilham *et al.* (U.S. Patent No. 5,191,388), and Grant *et al.* (U.S. Pat. Pub. No. 2003/0174306) references cited therein; and

BEING THUS DULY QUALIFIED, FURTHER DECLARE AS FOLLOWS:

1. The apparatus for producing polishing solution taught by Kondo *et al.* does not add diluent solution to a slurry bypass conduit when detecting particles of the slurry. Kondo *et al.* teaches using a bypass and analyzing the slurry without describing needing dilution. In particular, Kondo *et al.* uses a sensor that doesn't require dilution. For example, Fig. 3(a) does not show enough fluctuations of voltage values. It could have shown more fluctuations if the slurry was diluted. The lack of frequent fluctuations in the curve indicates that the slurry is not diluted. Therefore, adding a diluent solution to the bypass of Kondo *et al.* is not inherent.

2. Kondo *et al.* does not disclose a photo image sensor detecting a cross-sectional image of slurry flowing in the by-pass, detecting sizes of particles included in the captured image and a particle density of two dimensions of the slurry across a cross-section of the by-pass, and then using a slurry measuring unit to analyze the image captured by the photo image sensor. Instead, Kondo *et al.* teaches a particle detector that is a light-extinction type and adapted for irradiating a predetermined quantity of light on a flow cell fitted in the bypass conduit so as to detect an attenuation of the light transmitted through the polishing solution flowing through the flow cell, which is not an image. Rather, the result is a voltage fluctuation seen perpendicular to the flow direction. See Kondo *et al.* Fig. 2, paragraphs [0011], [0015], [0018], and Fig. 3.

3. In addition, the particle detector **7** of Kondo *et al.* includes a light detecting device such as a photodiode for detecting an intensity of the light emitted from the light source **72** and transmitted through the flow cell **74** (*see* Kondo *et al.* at paragraph [0048]). Therefore, the particle detector **7** of Kondo *et al.* does not analyze the cross-sectional image captured by the photo image sensor to measure the sizes of particles included in the slurry and the particle density of two dimensions of the slurry across the cross-section of the by-pass.

4. The apparatus for detecting and analyzing particulate matter in a slurry flow disclosed by Kilham *et al.* does not detect a particle density of two-dimensions. Rather, the optical fiber **22** of the apparatus taught by Kilham *et al.* detects a thin layer **84** image, which is a three dimensional image, of the slurry (*see* Fig. 3 and col. 7, lines 1-48 of Kilham *et al.*).

5. More particularly, Kilham *et al.* teaches imaging only a thin layer close to one end of the channel wall. Specifically, Kilham *et al.* states, at col. 7, lines 1-7:

> "In accordance with an important and essential aspect of the present invention, the focal length of optical fibers **22** which are used to view slurry **16** is very small such that only a thin layer **84** of slurry is focused for viewing, as shown best in

FIG. 3. Such layer **84** preferably has a thickness **T** equal to the largest size of particulate matter **17** in slurry **16**." (Emphasis Added).

In other words, Kilham teaches an image close to only one end of the channel wall, not a cross-sectional image which should include area between one end of the channel wall and the other end of the channel wall. Therefore, the particle detector **22** of Kilham *et al.* does not detect a particle density of two dimensions of the slurry solution across a cross-section of the by-pass.

6. I hereby further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

By: Wan-Shick Kim  June 30, 2008

Date